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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	004860.P1712C
First Inventor or Application Identifier	Michael Robert Hanson
Title	METHOD AND APPARATUS FOR TRANSMITTING DOCUMENTS OVER
Express Mail Label No.	EL414969793US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents

ADDRESS TO: Assistant Commissioner for Patents
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- ☒ Fee Transmittal Form
(Submit an original, and a duplicate for fee processing)
- ☒ Specification [Total Pages 42]
(preferred arrangement set forth below)
 - Descriptive title of the Invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to Microfiche Appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
- ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 17]
- Oath or Declaration [Total Pages 5]
 - ☐ Newly executed (original copy)
 - ☒ Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 16 completed)
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Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR §§ 1.63(d)(2) and 1.33(b).

- ☐ Microfiche Computer Program (Appendix)
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ACCOMPANYING APPLICATION PARTS

- ☐ Assignment Papers (cover sheet & document(s))
- ☐ 37 C.F.R. § 3.73(b) Statement (when there is an assignee) ☐ Power of Attorney
- ☐ English Translation Document (if applicable)
- ☒ Information Disclosure Statement (IDS)/PTO - 1449 ☒ Copies of IDS Citations
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16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

☒ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: 08/721,173

Prior application Information: Examiner Huedung Cao Group/Art Unit: 2772

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

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Attorney's Docket No.: 04860.P1712C

Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Hanson et al.

Application No.: to be assigned

Filed: Concurrently herewith

For: METHOD AND APPARATUS FOR
TRANSMITTING DOCUMENTS
OVER A NETWORK

Which is a continuation of:

Hanson et al.

Application No.: 08/721,173

Filed: September 27, 1996

Examiner: Cao, Huedung

Art Unit: 2772

Assistant Commissioner of
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Washington, D.C. 20231

PRELIMINARY AMENDMENT

Dear Sir:

IN THE TITLE

Please replace the title with --OBJECT ORIENTED EDITOR FOR CREATING WORLD WIDE
WEB DOCUMENTS--.

IN THE SPECIFICATION

On page 1, line 1, please insert --This application is a continuation of application no. 08/721,173, filed September 27, 1996.

On page 36, line 8, please insert --to-- after "output".

IN THE CLAIMS

Please cancel claims 1-13 without prejudice.

Please add the following new claims:

- 1 14. (New) A desktop publishing system, comprising:
- 2 a) an output display device, said output display device displaying:
- 3 1) a palette window comprising a defined objects panel comprising a list of
- 4 defined objects and an objects panel comprising a list of objects, and
- 5 2) a view window for displaying a page comprising at least one object from
- 6 one of said list of defined objects and said list of objects;
- 7 b) an input device, said input device selecting said at least one object from one of
- 8 said list of defined objects and said list of objects for display in said page.
- 1 15. (New) The desktop publishing system of claim 14, wherein said defined objects panel
- 2 comprising a list of defined objects comprises a user defined object panel comprising a list of
- 3 user defined objects.

1 16. (New) The desktop publishing system of claim 14, wherein said objects panel
2 comprising a list of objects comprises a predefined objects panel comprising a list of
3 predefined objects.

1 17. (New) The desktop publishing system of claim 14, wherein said input device is a
2 mouse.

1 18. (New) The desktop publishing system of claim 14, wherein said input device is a
2 keyboard.

1 19. (New) The desktop publishing system of claim 14, wherein said output display device
2 further displays an object editor window, said object editor window displaying a list of
3 properties associated with said at least one object from one of said list of defined objects and
4 said list of objects.

1 20. (New) In a desktop publishing system, a computer mediated method of generating and
2 displaying a collection of objects representing a document, comprising:
3 a) displaying a list of objects in a palette window on a display device, comprising:
4 i) displaying a list of defined objects in a defined objects panel in said palette
5 window;
6 ii) displaying a list of objects in an objects panel in said palette window;

- 7 b) receiving input from an input device selecting an object from one of said list of
8 defined objects and said list of objects for said collection of objects;
9 c) displaying said collection of objects in a page displayed in a view window of said
10 display device, including said selected object.

1 21. (New) The method of claim 20, wherein receiving input from an input device selecting
2 an object from one of said list of defined objects and said list of objects for said collection of
3 objects further comprises a mouse clicking on said object in said one of said list of defined
4 objects and said list of objects.

1 22. (New) The method of claim 20, wherein displaying a list of defined objects in a defined
2 objects panel in said palette window and displaying a list of objects in an objects panel in said
3 palette window, comprises displaying a list of user defined objects in a user defined objects
4 panel in said palette window and displaying a list of objects in an objects panel in said palette
5 window.

1 23. (New) The method of claim 20, wherein displaying a list of defined objects in a defined
2 objects panel in said palette window and displaying a list of objects in an objects panel in said
3 palette window, comprises displaying a list of defined objects in a defined objects panel in said
4 palette window and displaying a list of predefined objects in a predefined objects panel in said
5 palette window.

1 24. (New) The method of claim 23, wherein displaying a list of defined objects in a defined
2 objects panel in said palette window and displaying a list of predefined objects in a predefined
3 objects panel in said palette window, comprises displaying a list of user defined objects in a
4 user defined objects panel in said palette window and displaying a list of predefined objects in
5 a predefined objects panel in said palette window.

1 25. (New) The method of claim 20, further comprising:

2 a) receiving input via said input device, said input selecting said object for
3 modifying a property associated with said object;

4 b) displaying in an object editor window in said display device a value of said
5 property associated with said object;

6 c) receiving at said input device input modifying said value of said property
7 associated with said object.

1 26. (New) The method of claim 25, wherein receiving input via said input device, said input
2 selecting said object for modifying a property associated with said object comprises receiving
3 input via said input device, said input selecting said object from one of said list of defined
4 objects and said list of objects in said palette window.

1 27. (New) The method of claim 26 further comprising:

2 a) receiving input selecting one of said objects from said lists of defined objects and
3 said objects, said selected object having a property associated with said selected object, said

4 computer readable program code means for displaying a list of objects in a palette window on
5 a display device, comprising displaying a list of defined objects in a defined objects panel in
6 said palette window and displaying a list of objects in an objects panel in said palette window;
7 computer readable program code means for receiving input from an input device selecting an
8 object from one of said list of defined objects and said list of objects for said collection of
9 objects; and
10 computer readable program code means for displaying said collection of objects in a page
11 displayed in a view window of said display device, including said selected object.

1 32. (New) The article of manufacture of claim 31, wherein the computer program code
2 means for displaying a list of defined objects in a defined objects panel in said palette window
3 and displaying a list of objects in an objects panel in said palette window, comprises computer
4 program code means for displaying a list of user defined objects in a user defined objects panel
5 in said palette window and displaying a list of objects in an objects panel in said palette
6 window.

1 33. (New) The article of manufacture of claim 31, wherein the computer program code
2 means for displaying a list of defined objects in a defined objects panel in said palette window
3 and displaying a list of objects in an objects panel in said palette window, comprises computer
4 program code means for displaying a list of defined objects in a defined objects panel in said
5 palette window and displaying a list of predefined objects in a predefined objects panel in said
6 palette window.

04860.P1712

**METHOD AND APPARATUS FOR
TRANSMITTING DOCUMENTS
OVER A NETWORK**

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FIELD OF THE INVENTION

The present invention relates to a computer mediated method and apparatus for editing and publishing a Web document, or Web "page" on the Internet's World Wide Web.

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BACKGROUND OF THE INVENTION

The World Wide Web (the "Web") is a graphical hypertext-based interface that enables users to quickly move between Web sites and Web documents, also known as Web pages, on the Internet by following links to other Web documents or Web sites (Web pages) embedded within a Web document (Web page).

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Creating a Web Document

A Web document may contain many forms of information, including text, graphics, video, audio, and links to other Web documents anywhere in the world. Presently, Hypertext Mark-up Language (HTML) is the standard format for documents on the World Wide Web. An HTML formatted document has HTML codes, i.e., commands, embedded in the document.

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A software application known as a Web browser is used to access documents on the Web. By understanding HTML, Web browser software can properly display a Web document on a user's output display device. More importantly, Web browser software interprets the HTML commands in an HTML formatted Web document to navigate a link in that Web document to

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another Web document. The Web browser thereby provides automatic access to other Web documents on the Web.

A user with an understanding of HTML can create an HTML formatted Web document using any text editor software application, e.g., SimpleText,
5 available from Apple Computer, Inc. SimpleText is a basic American Standard Code for Information Interchange (ASCII) text editor application. However, the user has to embed HTML "tags" in the Web document.

HTML tags are inserted at the appropriate locations in a Web document to inform a Web browser how to display the various kinds of information in the
10 Web document. For example, Figure 2 illustrates an HTML formatted document 200. The document is interpreted and displayed on a user's output display device using a Web browser such as Netscape Navigator', available from Netscape Communications, Inc. Figure 3 shows the display 300 of the HTML
15 document in Figure 2 on an Apple Macintosh' computer system using Netscape Navigator' Web browser software.

HTML tags are typically paired. For example, the pair of tags "<html>" and "</html>" on lines 1 and 9 of Figure 1 identifies the information contained between the tags as an HTML document. The HTML document is comprised of a header indicated by the pair of tags "<head>" and "</head>" on lines 1 and 2,
20 and a body indicated by the pair of tags "<body>" and "</body>" on lines 2 and 8, respectively.

The pair of "<h1>" and "</h1>" on line 3 indicates a heading. Headings are numbered one through six, in order of decreasing font size. The text on line 4

ends with the end of paragraph tag "<P>". Upon detecting the end of a paragraph, a Web browser inserts a carriage return and a linefeed.

A horizontal rule tag, "<HR>", appears on line 5 of the HTML document. A Web browser inserts a horizontal line across the output display device upon encountering this tag. As can be seen from the example HTML document in Figure 1, editing a very simple Web document using a plain editor requires an understanding of HTML and careful attention to syntax.

Tag-based editors, also known as HTML editors, were developed to provide HTML extensions. The HTML extensions allow a user to edit a document, select a segment of the document and choose an appropriate HTML tag from a pull down menu or the like to insert the HTML tags around the selected segment of the document. This obviates the need for a user to learn the specific keystroke sequences representing a given pair of HTML tags. However, there is still a significant difference between what the user sees in an HTML document such as illustrated in Figure 1, and the corresponding display illustrated in Figure 2. Thus, a certain level of user-sophistication and trial and error is required to generate a Web document as desired by the user. To that end, more recent HTML editors known as What You See Is What You Get (WYSIWYG) editors have been employed to generate Web documents.

WYSIWYG HTML editors, such as WebMagic, available from Silicon Graphics, Incorporated, FrontPage, available from Vermeer Technologies, Incorporated, and Adobe PageMill, available from Adobe Systems, Incorporated, simplify the task of creating a Web page by presenting the user's working page,

i.e., a Web page being created by the user, as it would appear when accessed by a Web browser. In constructing the page, changes can be made by simple direct manipulation, as in a traditional word processor software application such as MacWrite, available from Claris Corp. WYSIWYG editors remove the need for
5 users to correctly formulate the syntax and structure of a Web document and allow greater attention to be paid to the visual appeal and format of the final Web document.

WYSIWYG editors are quite limited, however, by several structural features of HTML and the Web. One limitation is that the range of Web browsers
10 and platforms is as variable as the range of all computers, meaning that the visual presentation provided by a WYSIWYG editor will be appropriate for only a subset of the possible audiences of the document. A second limitation is that HTML is a rapidly evolving language with new features appearing every month, requiring expensive rewrites of WYSIWYG editors when major new features
15 such as tables or frames appear. A third limitation is that WYSIWYG editors do nothing to expose the underlying programmatic structure of an HTML document. For these reasons, many intermediate and nearly all expert users of HTML produce their documents "in the raw" without using a WYSIWYG editor. Thus, what is needed is a method for creating Web documents that removes the
20 need to understand HTML syntax while allowing the user to easily discern the format of the Web document as displayed on an output display device.

Publishing a Web Document

With reference to Figure 8, a simplified model of the elements comprising the World Wide Web (the "Web") on the Internet is depicted. The Web 810 is a graphical, hypertext-based interface that overlays the Internet. The Internet is a collection of interconnected, autonomous data communication networks which spans the globe. A user at a computer system executing a Web browser software application such as Netscape Navigator can access information in the form of Web documents or pages on the Web. The information may reside on the same or different computer system or systems. This model is often referred to as a client-server computing model, in which one or more clients 810 and 820 access or query a server 830 over a data communications network.

A server on the Web serves, or publishes, Web documents over the Web. The documents are available to a user who accesses the server from a client executing Web browser application software. The server and client communicate using a communications protocol. Typically, a server and client communicate over a data communications network underlying the Web using an International Standards Organization (ISO) Open Systems Interconnection (OSI) Application-layer protocol such as HyperText Transfer Protocol (HTTP). The Application-layer protocol provides a method of communicating ASCII-based, HTML-formatted information comprising a Web document published by a server. The Web document is transmitted over a data communications network to a client upon request from the client. The HTTP protocol, as an Application-layer protocol, utilizes the services of a standard set of OSI Transport-layer and

Network-layer data communication protocols such as the Transport Control Protocol/Internet Protocol (TCP/IP) suite of data communication protocols.

A client on the Web is comprised of a computer system executing Web browser application software. The client communicates with the server using HTTP, but must understand HTML as well, so that, among other things, upon receiving an HTML document from the server, the client knows how to display the document on an attached output display device.

As described above, HTML documents have traditionally been plain ASCII text files with HTML tags inserted at appropriate locations within the text file. The files are stored in a file system, as depicted in Figure 9. Figure 9 illustrates a traditional hierarchical file system 900 having a hierarchical directory structure 901 by which files, e.g., file A (902), are organized on a permanent storage medium such as a magnetic disk. File C 903 is a subdirectory containing files X, Y and Z. File Z 905 is a subdirectory as well for files 1, 2 and 3.

A server running the HTTP, i.e., an HTTP server, receives a request from a client for a particular HTML document. The HTTP server scans its file system directory 901 in search of the data file or files storing the HTML document. Upon locating the file or files in the file system, the HTTP server transmits the contents of the file using the HTTP. Thus, the HTTP server has no knowledge, and in fact, needs no knowledge, of the content or format of the HTML document to publish, i.e., transmit, the HTML document to the client over the data communications network.

A disadvantage in the above approach is that the contents of the HTML document are static. In other words, the contents of the HTML document do not change once created by an editor until such time as the document is directly modified by a user via an editor. To overcome this limitation, Common Gateway Interface Binary (CGI-bin) scripts were developed, which are essentially perl, C or C++ computer programs that output HTML-formatted ASCII text at run time. CGI-bin scripts allowed a server to generate content within an HTML document "on the fly," i.e., dynamically, depending upon the current state of the server, e.g., the date or time of day, or input from a user. The information provided as input from a user could be information obtained from a client through an HTTP request, e.g., information regarding who or where the user is located, security or access control information, etc.

As opposed to HTML documents, HTTP servers do need to understand a CGI-bin script insofar as a server must know where the scripts are located, how to execute the scripts, and how to receive the information output by the script and convert the information, if necessary, to HTML format before transmitting it to a client over the data communications network.

One disadvantage of CGI-bin scripts is the level of user sophistication required to develop the scripts due to the computer program-like nature of the script language. Moreover, the scripts must be compiled, and are also limited in that they output ASCII text which must then be converted by the HTTP server or some other process to the appropriate format for a Web document, e.g., HTML format. Additionally, the scripts are created independent of each other, making

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SUMMARY OF THE INVENTION

The present invention provides an object-oriented HTML based editor for creating Web documents to be published on the World Wide Web. Each HTML command is treated as a unique object having associated properties. A user
5 using an input device, such as a mouse, clicks and drags objects representing HTML commands from a palette window on an output display device. The objects are dropped into a collection of objects in a view window on the output display device. Each one of the objects in the collection of objects may be edited by way of a context sensitive object editor to customize the Web document. An
10 object is selected by an input device and dragged to an object editor window, where the properties associated with the object are displayed and may be modified.

The present invention allows the Web page created by the object-oriented HTML based editor to be saved as an object rather than a data file in a file
15 system. The object can then be published by a server on the Web as is, or the object can output its contents in a format requested by a client on the Web, e.g., an HTML formatted document.

It is a further object of the invention to provide a method for publishing a Web document having dynamic information, such that each time the Web
20 document is published, the information is up-to-date. A script language allows a user to create or edit an output handler associated with an object to provide dynamic behavior.

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BRIEF DESCRIPTION OF THE DRAWINGS:

The present invention is illustrated by way of example and not limitation in the following figures:

5 Figure 1 illustrates a computer architecture upon which an embodiment of the present invention can be implemented.

Figure 2 is an example of an HTML-formatted Web document created using a plain text editor software application.

Figure 3 illustrates a display of a Web document corresponding to the example Web document in Figure 1.

10 Figure 4 illustrates a message box window as may be utilized by an embodiment of the present invention.

Figure 5A illustrates a palette window as may be utilized by an embodiment of the present invention.

15 Figure 5B illustrates a palette window as may be utilized by an embodiment of the present invention.

Figure 6A illustrates a Web page viewer window as may be utilized by an embodiment of the present invention.

Figure 6B illustrates a Web page viewer window as may be utilized by an embodiment of the present invention.

20 Figure 6C illustrates an object editor window as may be utilized by an embodiment of the present invention.

Figure 6D illustrates an object editor window as may be utilized by an embodiment of the present invention.

Figure 6E illustrates an object editor window as may be utilized by an embodiment of the present invention.

Figure 7A illustrates a method for creating a user defined HTML object as may be utilized by an embodiment of the present invention.

- 5 Figure 7B illustrates a method for creating a user defined HTML object as may be utilized by an embodiment of the present invention.

Figure 8 illustrates a simplified model of the Internet's World Wide Web.

Figure 9 illustrates the file system for a computer system as may be utilized by an embodiment of the present invention.

- 10 Figure 10 is a diagram of an object system in which data objects are stored by an object oriented editor as may be embodied by the present invention.

Figure 11 is a flowchart of a method for publishing a Web document on the World Wide Web as may be embodied by the present invention.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

INTRODUCTION

The present invention provides an object-oriented HTML based editor for
5 creating Web documents to be published on the World Wide Web (the "Web").
The present invention further provides a method by which the Web documents
created by the object-oriented HTML based editor are published on the Web. In
the following description, numerous specific details are set forth describing
specific representations of data, specific processing steps, etc., in order to provide
10 a thorough understanding of the present invention. However, it will be apparent
to one of ordinary skill in the art to which the present invention pertains, or with
which it is most nearly connected, that the present invention may be practiced
without the specific details disclosed herein. In other instances, well known
systems or processes have not been shown in detail in order not to unnecessarily
15 obscure the present invention.

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COMPUTER HARDWARE

Referring to Figure 1, the computer system upon which the preferred embodiment of the present invention can be implemented is shown as 100.

5 Computer system 100 comprises a bus or other communication means 101 for communicating information, and a processing means 102 coupled with bus 101 for processing information. System 100 further comprises a random access memory (RAM) or other dynamic storage device 104 (referred to as main memory), coupled to bus 101 for storing information and instructions to be
10 executed by processor 102. Main memory 104 also may be used for storing temporary variables or other intermediate information during execution of instructions by processor 102. Computer system 100 also comprises a read only memory (ROM) and/or other static storage device 106 coupled to bus 101 for storing static information and instructions for processor 102. Data storage device
15 107 is coupled to bus 101 for storing information and instructions.

A data storage device 107 such as a magnetic disk or optical disk and its corresponding disk drive can be coupled to computer system 100. Computer system 100 can also be coupled via bus 101 to an output display device 121, such as a cathode ray tube (CRT), for displaying information to a computer user. An
20 alphanumeric input device 122, including alphanumeric and other keys, is typically coupled to bus 101 for communicating information and command selections to processor 102. Another type of user input device is cursor control 123, such as a mouse, a trackball, or cursor direction keys for communicating

direction information and command selections to processor 102 and for controlling cursor movement on display 121. This input device typically has two degrees of freedom in two axes, a first axis (e.g., x) and a second axis (e.g., y), which allows the device to specify positions in a plane.

5 Alternatively, other input devices such as a stylus or pen can be used to interact with the display. A displayed object on a computer screen can be selected by using a stylus or pen to touch the displayed object. The computer detects the selection by implementing a touch sensitive screen. Similarly, a light pen and a light sensitive screen can be used for selecting a displayed object. Such
10 devices may thus detect selection position and the selection as a single operation instead of the "point and click," as in a system incorporating a mouse or trackball. Stylus and pen based input devices as well as touch and light sensitive screens are well known in the art. Such a system may also lack a keyboard such as 122 wherein all interface is provided via the stylus as a writing instrument (like a
15 pen) and the written text is interpreted using optical character recognition (OCR) techniques.

Finally, in the currently preferred embodiment of the invention, computer system 100 is configured with a network interface card for coupling computer system 100 to a data communications network.

20

OBJECT ORIENTED EDITOR

An embodiment of the present invention providing for an object oriented authoring environment for creating Web documents will now be described. The

environment is comprised of an object system, object framework, script language, and a user interface.

Object System

5 The object system represents all data and procedures as objects. A character, for example, is a character object. An integer is an integer object. A project, e.g., a Web document, is an object. Each object has an associated set of properties and handlers. A property is storage space in an object. The storage has a name and holds exactly one value. In general, properties in an object oriented system are known as instance variables. A handler is a named segment of software code that is executed in response to a message, e.g., in response to an object informing another object to perform a function.

15 The object system is based on a prototype-based model where every object can be a template for creating new objects with different types of properties and handlers. In a prototype-based model, no distinction is made between an object and a template, i.e., all objects can be templates for other objects. In a prototype-based model, every object is a prototype, and every prototype is a type. Thus, each object is a type. The type represents the values of the properties and handler behavior associated with the object. Type is determined by inheritance from one or more parent objects. An object can refer to other objects. A property is an object reference. Objects can include other objects by reference. In fact, a property can include different types of objects at different times.

The object system provides support for many object, handler, and property related functions, including, but not limited to, adding or removing a property associated with an object, creating a child of an object, and duplicating an object.

- 5 Objects and their associated or inherited properties and handlers are organized into an object inheritance heterarchy where each object is the child of some other object. The structure is a heterarchy rather than a hierarchy due to the fact that an object can have more than one parent. The top object of the heterarchy is the object Object. Object contains all the handlers needed to create
10 new objects or copies of objects, initialize objects, add or remove properties, assign object names, etc.

- The object inheritance heterarchy lends itself well to HTML formatted Web documents which naturally have a hierarchical containment structure to them (e.g., an HTML document contains a head and a body, a body contains
15 tables, headers, lists and paragraphs, a list contains list headings and list items, etc.) This property of containment is used heavily by the object oriented editor of the present invention, especially for the creation of custom objects created by the user.

- The present invention also provides for the creation of a hierarchy of
20 HTML objects which contain methods to 1) create appropriate HTML, 2) provide for an extensible and flexible list of attributes, and 3) create on-screen editor features. Additionally, the present invention provides for overriding any of these methods for any given object(s). The creation of a flexible and extensible

list of attributes is useful so that if the protocol for HTML changes in the future (e.g., if future versions of HTML provide for horizontal rules to have an associated color), the user could easily make the required changes to the object oriented editor of the present invention without any need for a recompilation or
 5 redistribution of an HTML document by the developer. This also provides a user with the ability to take out unwanted features in an HTML document.

Concept of Objects, Properties, and Handlers

Objects are analogous to nouns in the English language. An object is a
 10 thing. Objects are defined in terms of other objects. An object is defined by the object's features and the object's relationship to its parents. The features of an object are its properties and handlers. An object can be a child of one or more parents. A child inherits the features of its parent(s). Since a parent object inherits the features of its parents, the child inherits the features of its ancestors.

15 An example of an object is the HTML horizontal rule (HR). The object HR can be used to store information about horizontal rules in a Web document. Thus, the object HR has properties associated with it such as width, size, alignment, and shading. Each of these properties, in turn, can have a value, e.g., width = 100%, alignment = center, etc. The object HR can be enriched by
 20 defining a handler for it that makes some use of the information associated with the object.

Properties are analogous to adjectives in the English language. A property is storage space in an object. This storage has a name and can hold exactly one

value. This value can be anything ranging from a Boolean value to a collection of values including a list, an array, or any kind of object.

Handlers are similar to verbs in the English language. The behavior of and operations performed on objects are controlled by handlers. A message handler, or simply, handler, is a named piece of software code that is executed in response to a message or event. Handlers are procedures available to an object that specify some action to be performed. A handle is the name of a behavior that the object is asked to perform.

10 *Object Framework*

The Object Framework provides a set of objects for developing Web documents. The framework provides objects that represent files, Input/Output (I/O) devices, sounds, shapes, dates, clocks, etc., i.e., objects that abstract away particulars of a computer operating system and hardware upon which the Web document is created and published. In addition, objects are provided for low level graphics and much higher level aspects of graphics, including objects for traditional data types such as integers, characters, strings, as well as arbitrary collections of objects, arrays, list and vectors, objects that handle errors and events, and user interface objects such as buttons and scrollers.

20

Script Language

A script language is provided by an embodiment of the present invention. The script language is a complete object oriented programming language for

writing, compiling, and executing handlers, obviating the need to develop the handlers in lower-level code. Because the script language is an object oriented language, script code is associated with an object. Such code is called a 'functional-handler', or simply, handler. Each handler is owned by exactly one object. New objects are created from existing objects. By default, a new object shares, or 'inherits' all the handlers owned or inherited by the objects it is created from, i.e., the object's parents.

User Interface

A user interface, termed Project Builder, provides for general purpose direct manipulation of a user project, e.g., for developing a Web document. The Project Builder provides a variety of object and script language browsers and editors. A user project is the workspace in which a user develops a Web document. The process of building a Web document consists of the general steps of designing a user interface for the Web document, customizing the interface by changing properties and scripting the interface to provide a certain behavior, experimenting with the look and feel of the interface, and finally, continuing with a more detailed implementation of the Web document's functional requirements.

User Interface Windows

In one embodiment of the present invention, The Project Builder interface has windows that are characterized by an appearance similar in design to the

Apple Macintosh computer system, but distinct enough to avoid confusion with the Web document a user is creating.

In many of the windows, there are multiple panels in which a user can type. The field which is highlighted in white is the active typing field. If the window is not selected, all panels therein are gray. When the window is active, one of the panels is white to indicate that any keystrokes will be sent to this panel. Within any window, the Tab key changes focus from one panel to another panel.

The Project Builder interface supports drag and drop operations. A user can use an input device such as a mouse to click on, then drag and drop references to objects, properties, and handlers between the various windows, editors and browsers. For example, as will be described with reference to a specific example below, a user can click on a particular object for a period of time, such as half of a second, and a gray box appears around the name of the object. The box can be dragged to a field in an editor or window and dropped there to cause the editor or window to focus on this object. Indeed, several objects can be selected, dragged and dropped in this manner, for example, by simultaneously holding down the shift key on a keyboard while clicking on the objects with an input device such as a mouse. It should be noted that the user is not dragging the actual objects around, only references to the objects. Dragging a reference around will not affect the object.

Throughout Project Builder, an item can be selected and the delete key pressed to remove it. For example, a user can select a handler and press the

delete key to remove the handler. In the same manner, the user can delete properties, handlers, functions, constants and variables. Objects can be removed in the same way, provided there is not a reference to the object

Many of the Project Builder windows are designed to provide a user with context sensitive information. A description of the various windows that appear on output display device 121 follows.

Message Box Window

With reference to Figure 4, the Message Box window 400 provides a window in which to type script commands and receive system messages. The Message Box window 400 is comprised of a listener panel 401, panel splitter 402 and display panel 403. The listener panel 401 is a script command line interface that allows a user to communicate with the Project Builder interface by typing into it. When the Return or Enter key is pressed, the listener panel 401 evaluates the script command typed therein and responds in the display panel 403. Panel splitter 402 separates listener panel 401 from display panel 403.

Display panel 403 displays messages from the object oriented editor of the present invention. The display panel 403 provides responses to commands entered into the listener panel 401. Display panel 403 also provides status information during the execution of certain operations, such as saving or loading a Web document.

HTML Palette Window

Figures 5A and 5B illustrate the HTML Palette window 500. The HTML Palette window 500 has two panels: user panel 501, and widgets panel 502, which may display different libraries of predefined HTML objects, such as the library of HTML header objects illustrated in Figure 5A, or the library of HTML body objects illustrated in Figure 5B. To select an object in either of the panels, a user clicks on the object. To switch between the library of HTML header objects and the library of HTML body objects, a user pulls down on the pull down menu 503 at the top right corner of the widgets panel 502.

10 The user panel 501, although illustrated as empty in Figures 5A and 5B, displays new user-defined HTML objects created by the user. It is possible to drag and drop an HTML object from widgets panel 502 to user panel 501. The user may first choose to modify a predefined HTML object from widgets panel 502, rename it, and store it in user panel 501. The predefined HTML object is
15 modified by the user first dragging the HTML object to an object editor window, as described in more detail below. This allows a user to reuse a predefined HTML object, such as a header, by modifying a property or handler associated with the predefined HTML object, and creating a new user-defined HTML object that is identical to the predefined HTML object with the exception of the
20 modified property or handler. This ability is fundamental to the concept of software reuseability in object oriented programming. The ability to click and drag on a predefined object for the purpose of reusing the object to create custom objects provides for efficient construction of Web documents. For example, the

5

HTML Page Viewer Window

10

20

page, the page is rendered into text, saved into a temporary file on a permanent storage medium and passed to a Web browser with instructions to open the temporary file and display it in a window on an output display device, for example, the same output display device on which the windows of the object editor of the present invention are being displayed. Indeed, a user often positions the Web browser window along side the object editor window, thereby allowing side-by-side editing and previewing. By using separate Web browser application software, the present invention allows the user to try out a Web page with any Web browser. Additionally, New button 605 creates a new Web page, wherein the user is prompted for a Web page name. Finally, Delete button 605 deletes the current Web page.

Page structure panel 608 displays a representation of a collection of objects from different segments of a Web page depending on what menu is selected from pull down menu 609. Page structure panel 608 can display a representation of a collection of objects from a Web page header segment, as illustrated in Figure 6A, or a representation of a collection of objects from a Web page body segment, as illustrated in Figure 6B. To switch between the header segment display and the body segment display in the page structure panel 608, a user pulls down on the pull down menu 609 at the top right corner of the page structure panel 608.

Having selected either a header or body Web page segment for display in the page structure panel 608, a user can create or modify an existing Web page by clicking on, i.e., selecting, and dragging the appropriate representation of HTML objects from the widgets panel 502 in the HTML Palette window 500 to the page

structured panel 608 and dropping the representation of HTML objects therein. For example, with reference to Figure 6C, a user can click on and drag a representation of the HTML object Header (at 620) and drop the representation of the HTML object Header in the body segment display of page structure panel 608 (at 621).

A user can also remove an object from the collection of objects comprising the Web page by using an input device to click on the representation of the object in the page structure panel 608 and pressing the delete key on the keyboard.

10 Object Editor Window

With reference to Figure 6C, the Object Editor window 610 allows the viewing and modification of objects. It displays all aspects of an object, including the properties associated with the object, property values, and handlers defined only by the object or its parent(s). Multiple Object Editor windows may be displayed on output display device 121. Additionally, multiple objects and their associated properties may be displayed in the Object Editor window at the same time, for example, by holding down the shift key on the keyboard while selecting objects with an input device such as a mouse to drag and drop the objects into the Object Editor window.

20 The Object Editor window, e.g., Object Editor window 610, is comprised of a object display panel in which an icon 626 representing the object and a corresponding name, e.g., HTMLText 623, representing the object, appears. Preview button 611 in the Object Editor window 610 demonstrates the object

oriented nature of the present invention. For example, since a page, a paragraph, and a horizontal rule are all treated as objects, they share the same preview method. If, for example, a user is editing a table embedded in a complicated Web page, but wants to see just the table and not all the other items around it, the user

5 can select the table and click on the Preview button 611 to preview just the table in a Web browser window. This functionality is inherited from the root HTML object and provides preview functionality to every HTML object created by the user.

The Object Editor window is further comprised of a properties display

10 panel 614, via which a user is able to directly manipulate the properties associated with the object. The Edit PostHTTP button 612 and Edit OutputHTML button 613 within properties display panel 614 are provided for advanced users to write their own script methods on any object. A user can, for example, drag a horizontal rule into a document and then make the horizontal

15 rule appear as a graphical image. The user would simply click on the rule, click on the Edit OutputHTML button and write a method that said something like, "if currentUser's fancyLayout is TRUE then return "" else return do inherited." (This assumes currentUser is a global variable that has been previously set up with some sort of object describing the user looking at the

20 page; and, requires the scripter to understand HTML to the extent necessary to create the 'img' tag). Because the horizontal rule object created in the first step is a new child of the root HorizontalRule object, the new behavior attaches only to the child. If the user wants to use the object again, the user drags the object into

the user objects panel 501 and reuses it. The outputHTML button 613 is a handler that is used when the current Web page is requested by a remote user; a postHTTP handler can be used when the user fills out a form and "posts" the form results to the Web document (and therefore is useful for creating interactive
5 pages).

Having selected an HTML object from either the user or widgets panel of the HTML Palette 500 for inclusion in the collection of objects comprising the current Web document in the page structure panel, a user can edit or modify the properties associated with the object via a context sensitive object editor window.
10 For example, with reference to Figure 6C, a user clicks on the representation of the HTML object HTMLText 622 in the page structure panel 608 of Viewer window 600. The user then drags the representation of the HTML object HTMLText 622 and drops it into Object Editor window 610. The object display panel shows an icon and an object name HTMLText 623 representing the HTML
15 object. Furthermore, the properties display panel 614 provides access to the font styles 625, information styles 626 and text string 624 properties associated with the HTML object HTMLText. The user can manipulate any of these properties, as is illustrated by creating the text string "This is a header" in the property display panel.

20 As another example, with reference to Figure 6D, a user clicks on a representation of the HTML object HTMLHorizRule 634 in the page structure panel 608. The user drags the representation and drops it into Object Editor window 610. The object display panel provides an icon and object name

representing the HTML object HTMLHorizRule. The context sensitive nature of the properties display panel is apparent when comparing the properties display panel in Figure 6C vis-a-vis the properties display panel in Figure 6D. The properties display panel 614 in the latter case displays those properties

- 5 associated with the HTML object HTMLHorizRule, namely, width 630, size 631, alignment 632 and the Boolean No Shading 633. Figure 6E illustrates yet another example of the contextual nature of the object editor window, in which the property Level 640 is displayed in the properties display panel 614 for the associated HTML object HTMLHeader, selected and dropped into the object
- 10 editor window from the page structure panel 608. The property value is 2, but may be modified to any value from one to six.

- The concept of constraintment is illustrated by the pull down menus for the properties font styles 623 and information styles 626 in Figure 6C, and alignment 632 (e.g., center, left, and right) in Figure 6D, and Level 640 in Figure
- 15 6E. A user is constrained as to the set of values from which to choose for each property.

- In an alternative embodiment, a property value for an object is edited by double-clicking on the property or selecting the property and pressing the Return or Enter key. The properties display panel is replaced by a value editor panel for
- 20 the particular property selected.

Additionally, a user can select an HTML object from either the user or widgets panel of the HTML palette and drag the object directly to an object editor

window to directly manipulate the properties associated with the object via an object editor window.

With reference to Figure 7A, an object whose properties have been modified may be stored in user panel 501 of Palette window 500 for subsequent use in the collection of objects in a page opened in page structure panel 608. Storing in the user panel an object whose properties have been modified can be accomplished a number of ways. The user can click and drag a representation of an object, e.g., the representation 701 of HTML object Header from the page structure panel 608 to the user panel 501. If a property associated with the HTML object has been modified via the object editor window so that the object no longer is identical to the predefined object in the widgets panel 502, the user is prompted with a pop up window 704. The user types in a new name for the modified object, e.g., BoldHeader (at 703), in the pop up window and presses the Return or Enter key or selects the OK button. As illustrated in Figure 7B, a representation of the modified object BoldHeader 703 then appears in the user panel 501 of the Palette window 500.

Alternatively, a user can select the icon or name representing an object in the object display panel of the object editor window and drag the representation to the user panel in the Palette window 500. As in the case where the user selects the representation of the object from the page structure panel, the user is prompted via a pop up window for a name for the object.

A direct manipulation editor for adding a property to a predefined HTML object is not provided. A property is added to an HTML object as follows.

Suppose the HTML protocol changed and images could have a "translucent" property. To add the property, the user types (at the message box command line) syntax such as:

5 "insert {"translucent", "Is Translucent", checkbox} at end of
objectPropertyList of HTMLImage"

The command adds a new entry with property name "translucent," user-interface description "Is Translucent", and type "checkbox" (other options include text,
10 number, color, list, etc.) to the property list for HTMLImage. The object editor of the present invention would then reconfigure itself to display this new property, the outputHTML handler would correctly interpret it, and the parser would take note of it the next time the user attempted to load a Web page.

A description for creating a dynamic object, e.g., a timestamp based on the
15 HTML object Header, follows. To create the dynamic object timestamp based on the HTML object Header, the user drags a new header into a page and set its level to 2 (i.e., a reasonably large, bold header). Then the user clicks on the "outputHTML" button in the object editor window for the object Header. A script editor window appears, into which the user types:

20

```
global theDate
global theTime
return theTime as string & ", " & theDate as string
```

The user then saves the changes and exits the script editor. To keep the new object, the user clicks on it and drags it to the user panel 501. An embodiment of the present invention then asks for a name, to which the user responds, for
5 example, by typing "TimeStampObject." A dynamic, reusable timestamp object is now placed in the list of widgets in widgets panel 502. Note that while this is a fairly advanced example of creating a dynamic object, many useful compound objects can be created without any scripting at all, simply by compositing a set of useful objects into a container, as set forth in the example of "employeeInfo"
10 above.

PUBLISHING A WEB DOCUMENT

An embodiment of the object oriented editor described above saves an HTML document as an object, rather than a data file. Figure 10 illustrates object
15 oriented editor 1000 on a server 830 saving Web documents as objects, such as object 1010. Recall from the above discussion that an object is itself a collection of objects.

The object comprising a Web document can be transferred by the server to a client over a data communications network. Alternatively, the object
20 comprising the Web document can be executed by the server. The object, in turn, causes each object contained therein to execute and output a representation of the object in whatever format is requested by the client. For example, a client can send a request to the server over the data communications network. The

requests specifies a particular Web document. The server searches its collection of objects in its object space for the object requested. The server, upon finding the object, and depending upon the nature of the client's request, will publish, i.e., transmit, the object as is to the client, or execute the object. The object

5 outputs a representation of each object contained within the object in a format specified by the client. Thus, if the client requests an HTML formatted Web document, the server executes the object representing the Web document, passing as input to the object, an input argument indicating the output of each object within the Web document is to be formatted in HTML.

10 With reference to Figure 11, a method of publishing a Web document as embodied by the present invention is more fully explained. The process begins at step 1101 with the server and client having established an application-layer communication protocol connection. In the present embodiment, the client and server communicate with each other over a data communications network using

15 HTTP. It is understood, of course, that other application-layer protocols may be used to establish and maintain appropriate communications between the client and server.

At step 1102, the server receives a request from a client over a data communications network. The request specifies an object, e.g., a Web document

20 a user wants to display on the output display device coupled to the client. The request may also specify a property or a list of properties. A value or list of values may be assigned to the property or list or properties.

At step 1103, a handler for the root object Object searches in the object space on the server for the object specified by the client. At step 1104, a message is returned depending on whether the object specified by the client is found. If the object is not found, the handler, at step 1105, returns a message to the server
 5 that the object is not found. The server, in turn, communicates the message via the HTTP to the client. If, however, the object is found, the handler determines, at step 1106, whether a read (get) from or write (post) to the object is to be performed. Generally, publishing a Web document involves a read from the object representing the Web document, and so the flow chart continues to step
 10 1107.

At step 1107, the object checks for the presence of input arguments, e.g., properties and values assigned to the properties. If arguments are present,

At step 1108, the "outputHTML" handler of every object in the page is called in an pre-order traversal of the container hierarchy. If there exists, for
 15 example, a header object containing an image object and a text object, the handler would perform the following steps:

outputHTML the header (insert "<H1>" into stream)
 outputHTML the image (insert "" into stream)
 20 finish outputHTML the image (no action)
 outputHTML the text (insert "... the text..." into stream)
 finish outputHTML the text (no action)
 finish outputHTML the header (insert "</H1>" into stream)

When the process completes, the stream contains the entire Web page. The Web page can be used in any manner. For example, the Web page could be to the network to answer a remote request, saved to a temporary file on disk for use in
5 a preview, or displayed to the user in a text buffer.

At step 1109, the handler outputs an HTML formatted representation of the object to the server. The last step, at 1110, is publishing, i.e., transmitting, the HTML formatted output the client.

10 In the foregoing specification, the invention has been described with reference to specific embodiments thereof. It will, however, be evident that various modifications may be made thereto without departing from the broader spirit and scope of the invention. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense. The
15 present invention is intended to be limited, therefore, only by the claims presented below.

IN THE CLAIMS

What is claimed is:

- 1 1. In a client-server computing environment, a method for a server
2 publishing a data object to a client coupled to said server over a data
3 communications network, comprising the steps of said server:
 - 4 a) receiving a request for said data object from said client over said
5 data communications network;
 - 6 b) identifying said data object on said server based on said request;
7 and
 - 8 c) publishing a representation of said data object to said client over
9 said data communications network in response to said request.
- 1 2. The method of claim 1, wherein step a) includes receiving an application
2 layer protocol request for said data object from said client over said data
3 communications network.
- 1 3. The method of claim 2, wherein said step of receiving an application layer
2 protocol request for said data object from said client over said data
3 communications network includes receiving a hypertext transfer protocol
4 (HTTP) request for said data object from said client over said data
5 communications network.

1 4. The method of claim 1 wherein step a) includes receiving a request for
2 said data object from said client over said data communications network, said
3 request specifying a format for said data object.

1 5. The method of claim 4 wherein said step of receiving a request for said
2 data object from said client over said data communications network, said request
3 specifying a format for said data object, includes receiving a request for said data
4 object from said client over said data communications network, said request
5 specifying a hypertext markup language format for said data object.

1 6. The method of claim 5 wherein said step of receiving a request for said
2 data object from said client over said data communications network, said request
3 specifying a hypertext markup language format for said data object, includes
4 receiving a request for said data object from said client over said data
5 communications network, said request specifying a hypertext markup language
6 format, a data object name, and an argument list, for said data object.

1 7. The method of claim 6 wherein said step of receiving a request for said
2 data object from said client over said data communications network, said request
3 specifying a hypertext markup language format, a data object name, and an
4 argument list, for said data object, includes receiving a request for said data
5 object from said client over said data communications network, said request
6 specifying a hypertext markup language format, a data object name, and a

7 property list, for said data object, wherein said property list is comprised of a
8 property and a value assigned to said property.

1 8. The method of claim 6 wherein said step of receiving a request for said
2 data object from said client over said data communications network, said request
3 specifying a hypertext markup language format, a data object name, and an
4 argument list, for said data object, includes receiving a request for said data
5 object from said client over said data communications network, said request
6 specifying a hypertext markup language format, a data object name, and a
7 property list, for said data object, wherein said property list is comprised of a
8 plurality of properties and a plurality of values each assigned to one of said
9 plurality of properties.

1 9. The method of claim 6 wherein said step of receiving a request for said
2 data object from said client over said data communications network, said request
3 specifying a hypertext markup language format, a data object name, and an
4 argument list, for said data object, includes receiving a request for a dynamic
5 data object from said client over said data communications network, said request
6 specifying a hypertext markup language format, a data object name, and a
7 property list, for said dynamic data object.

1 10. The method of claim 4 wherein said step of publishing a representation of
2 said data object to said client over said data communications network in

3 response to said request includes publishing a representation of said data object
4 to said client over said data communications network in response to said request,
5 wherein said representation of said data object is based on said format for said
6 data object specified in said request.

1 11. In a client-server computing environment, a method for a server
2 publishing a representation of a dynamic data object (DDO) to a client coupled to
3 said server over a data communications network, comprising the steps of said
4 server:
5 a) receiving a request for said DDO from said client over said data
6 communications network, said request specifying a DDO name and a set of
7 values;
8 b) identifying said DDO on said server based on said DDO name;
9 c) passing as input to said DDO said set of values;
10 d) executing said DDO using said set of values as input;
11 e) generating said representation of said DDO; and
12 f) publishing said representation of said DDO to said client over said
13 data communications network.

1 12. The method of claim 11 wherein step a) includes receiving a hypertext
2 transfer protocol (HTTP) request for said DDO from said client over said data
3 communications network, said request specifying a DDO name and a set of
4 values.

ABSTRACT

An object comprising a Web document is transferred by a server to a client over a client-server data communications network. Alternatively, the object comprising the Web document can be executed by the server. The object, in turn, causes each object contained therein to execute and output a representation of the object in whatever format is requested by the client. For example, a client can send a request to the server over the data communications network. The request specifies a particular Web document. The server searches its collection of objects in its object space for the object requested. The server, upon finding the object, and depending upon the nature of the client's request, will transmit the object as is to the client, or execute the object. The object outputs a representation of each object contained within the object in a format specified by the client. Thus, if the client requests an HTML formatted Web document, the server executes the object representing the Web document, passing as input to the object an input argument indicating the output of each object within the Web document is to be formatted in HTML.

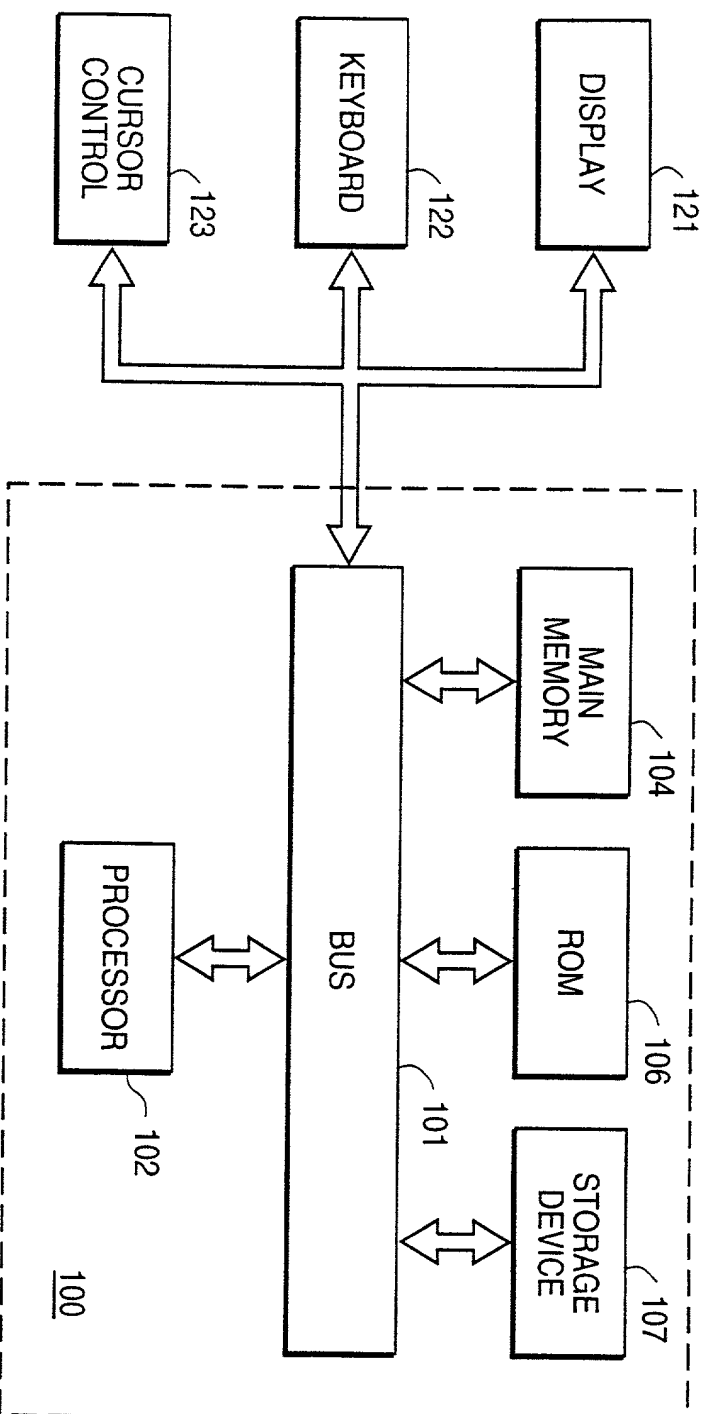


FIG. 1

Line No.

```

1    <html><head><title>Demo.html</title>
2    </head><body>
3    <h1>This is the header</h1>
4    This is some text.<P>
5    <HR>
6    <H2>12:21 PM, May 24, 1995</H2>
7    <b>12:21 PM, May 24, 1995</b>
8    </body>
9    </html>

```

FIG. 2
(PRIOR ART)

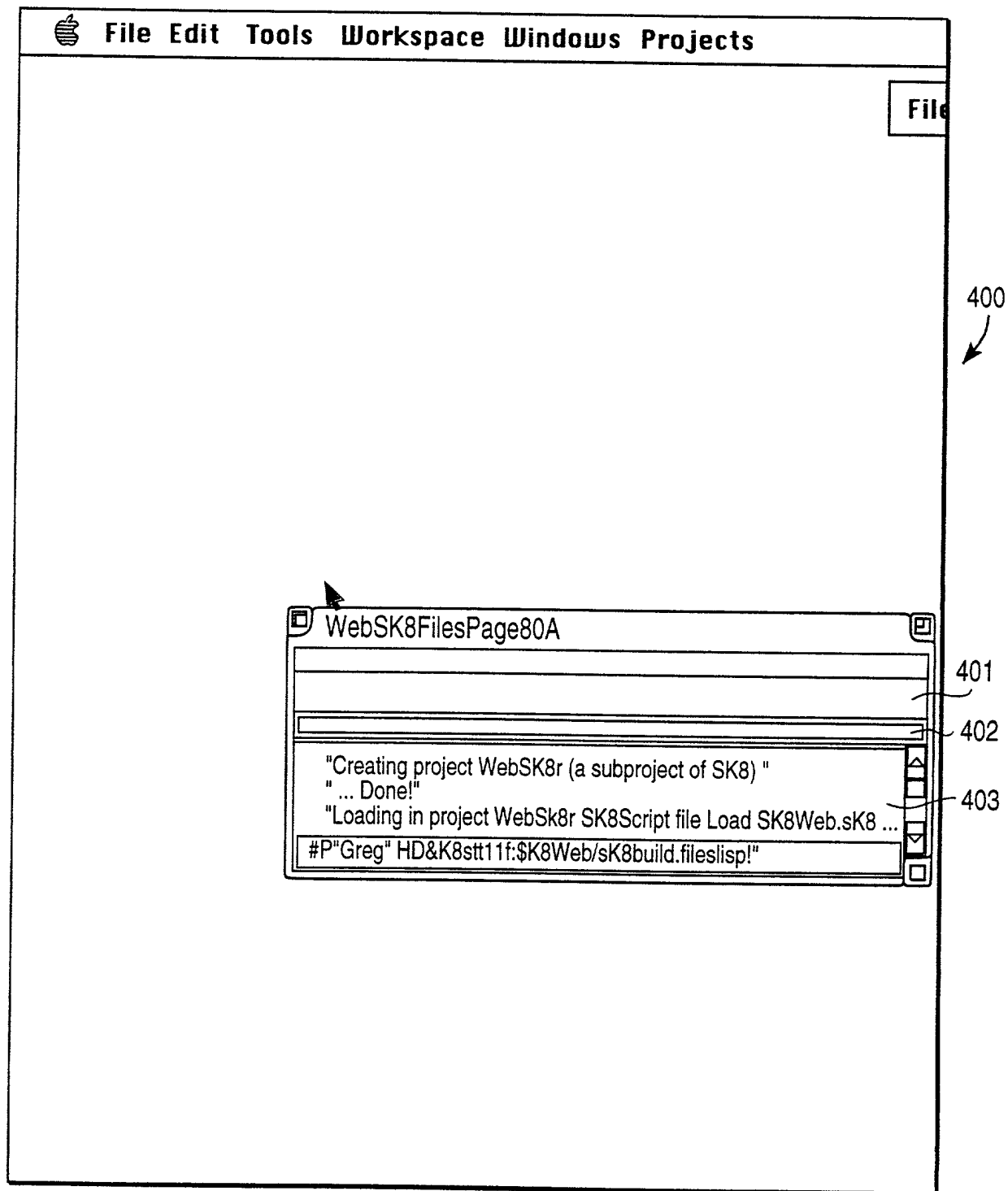


FIG. 4

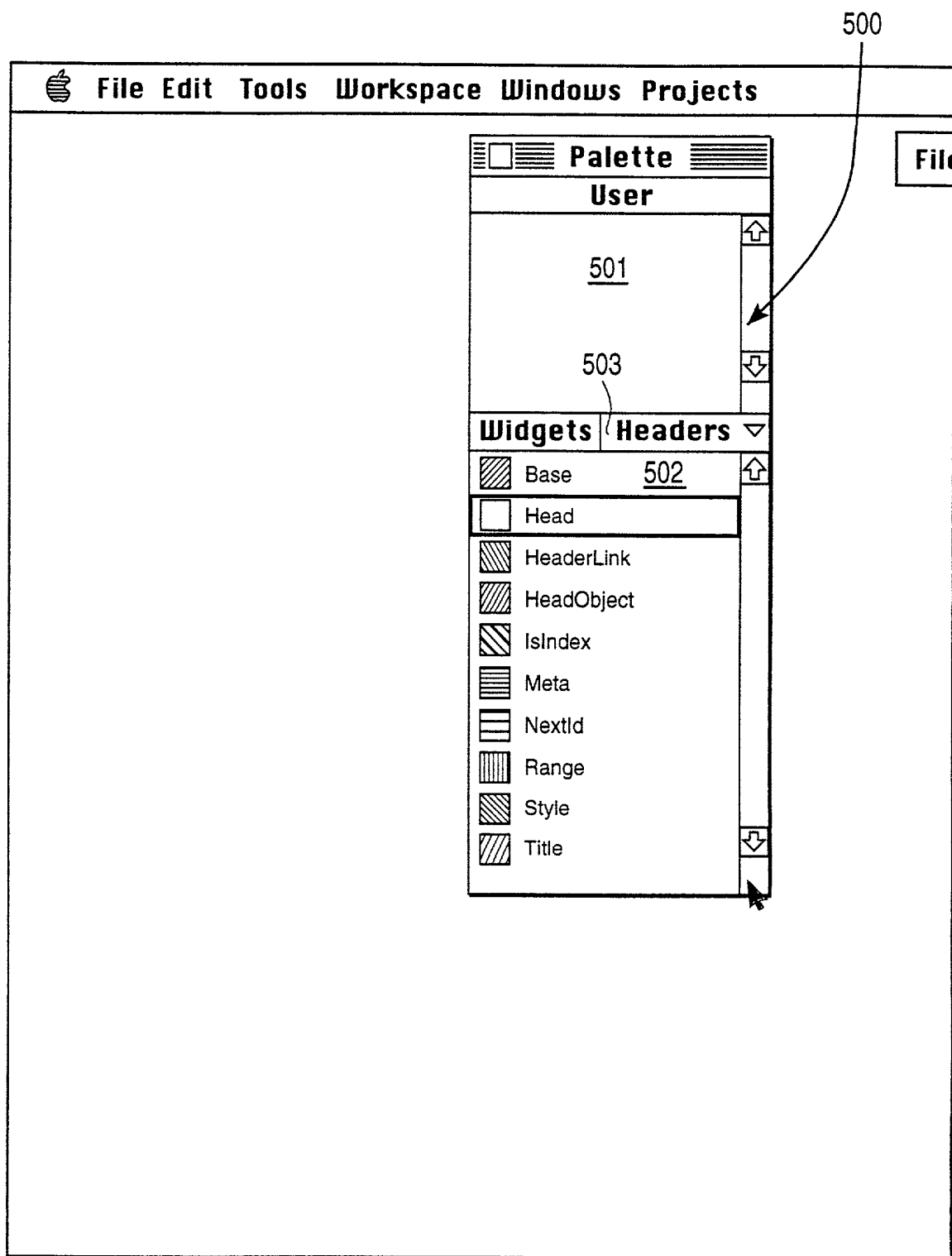


FIG. 5A

FIG. 5B

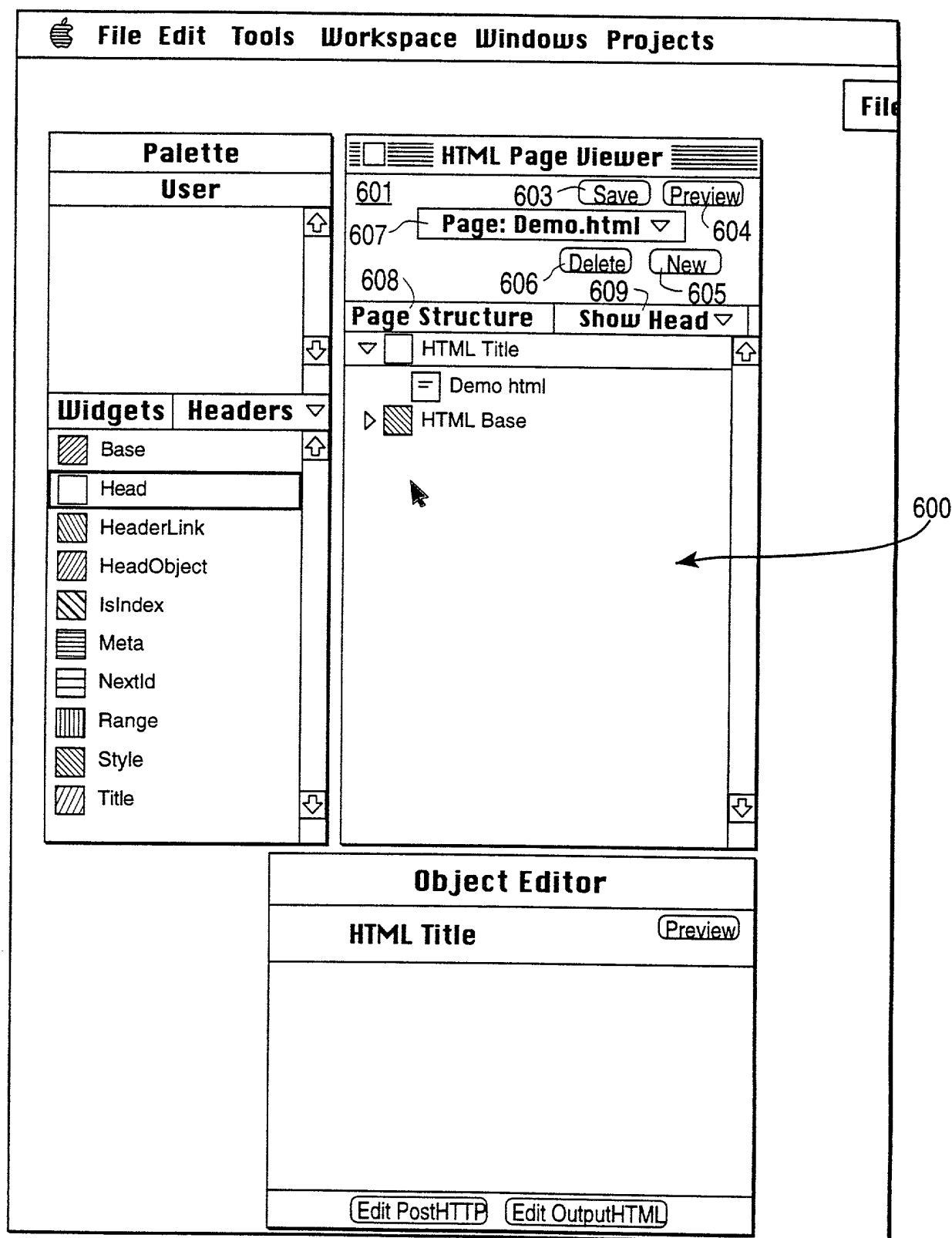


FIG. 6A

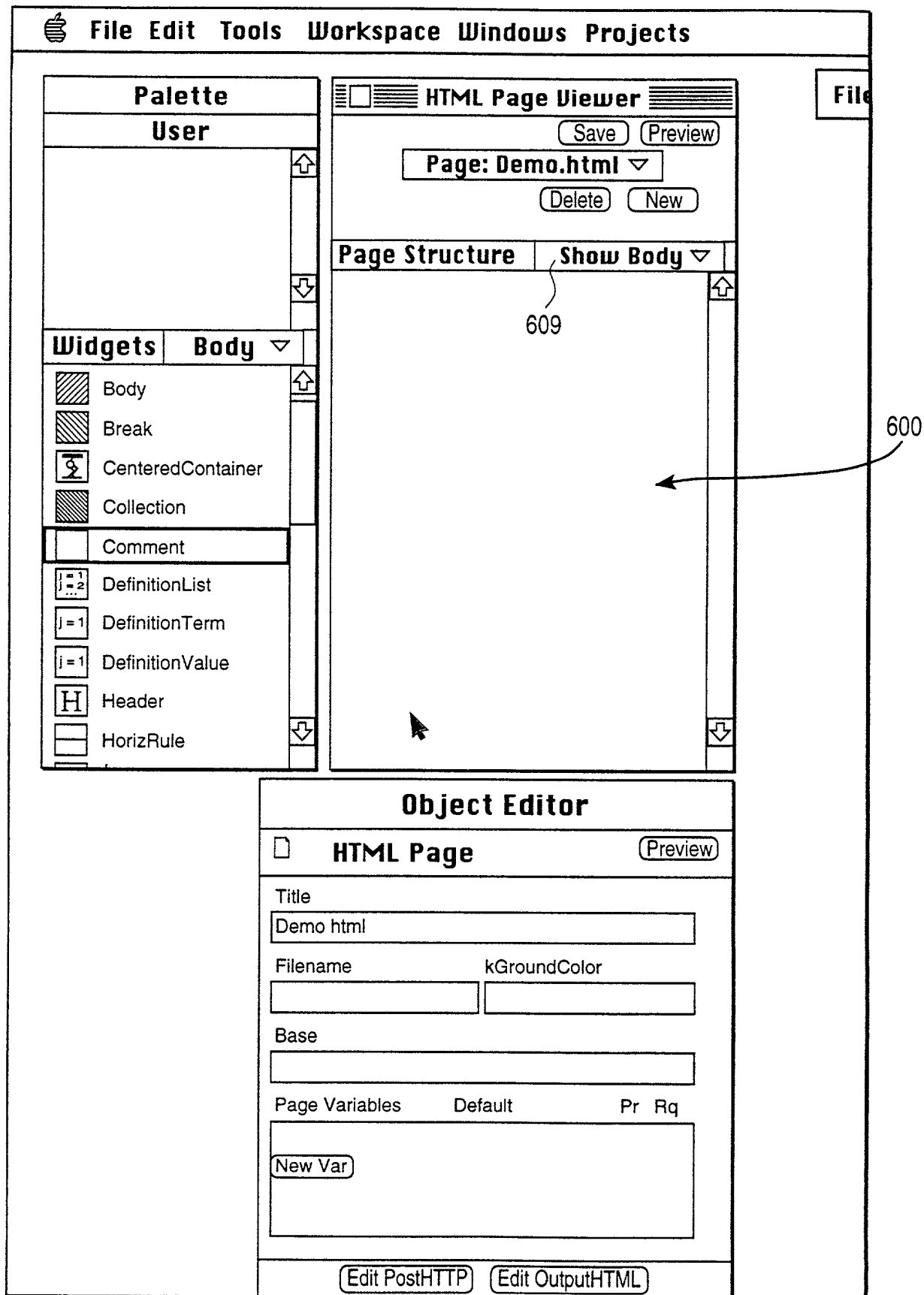


FIG. 6B

FIG. 6C

FIG. 6D

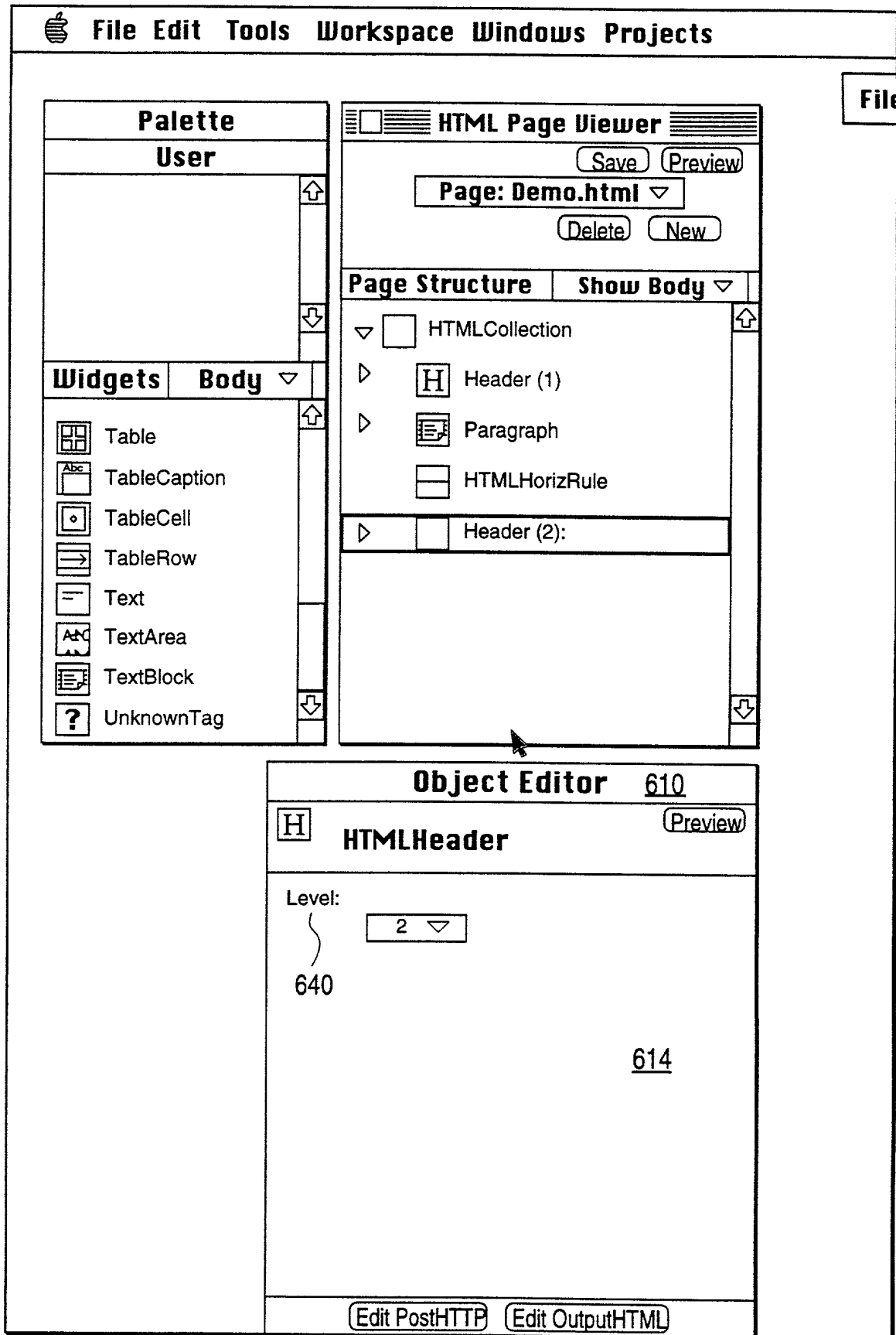


FIG. 6E

FIG. 7A

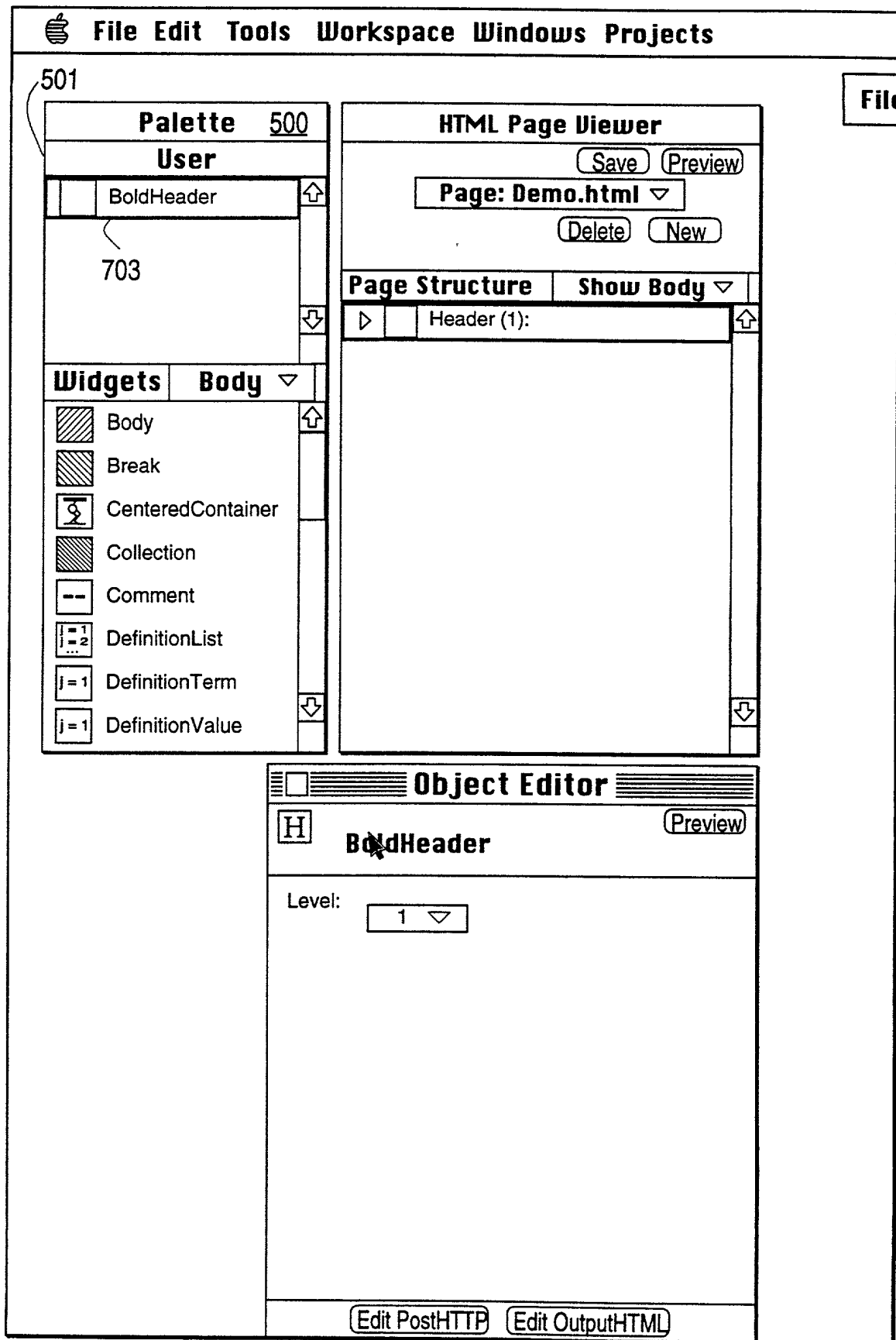


FIG. 7B

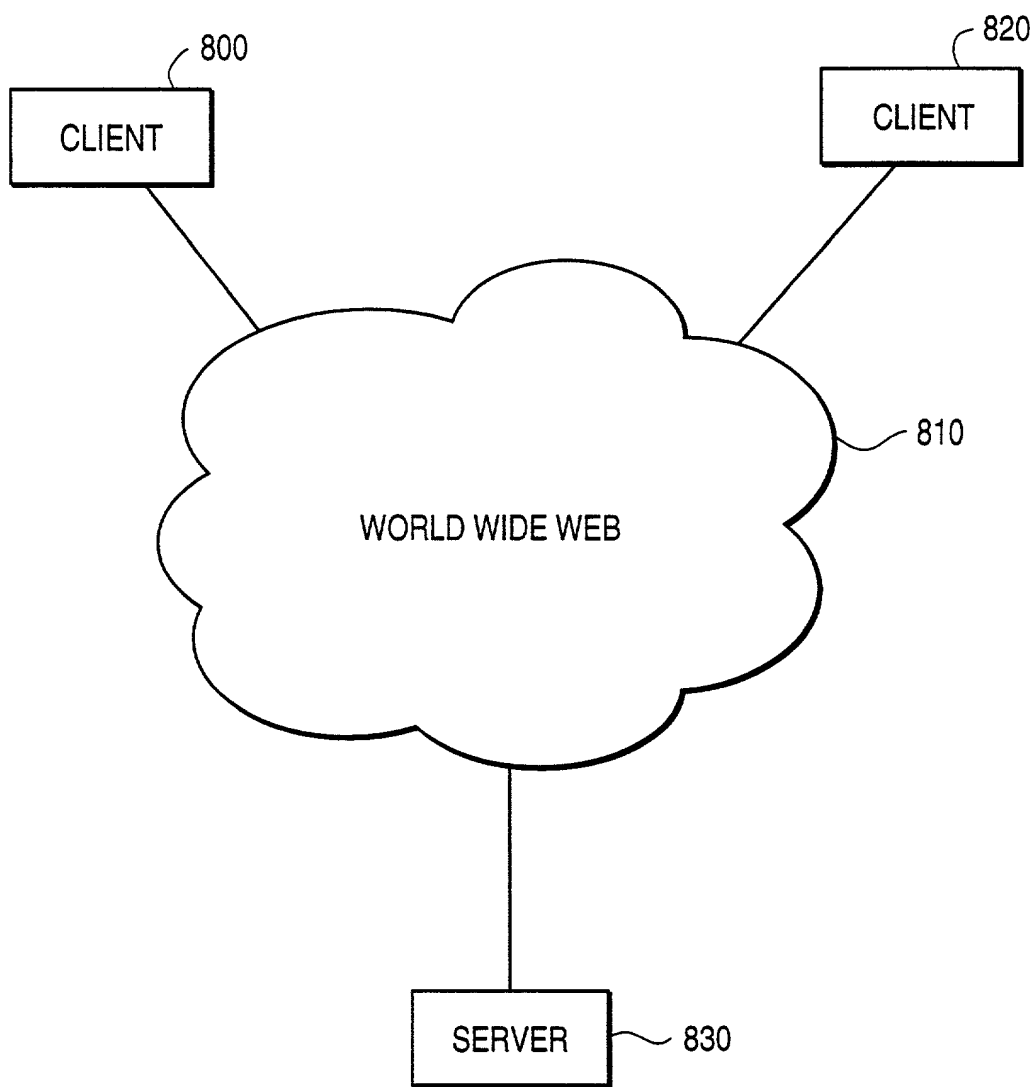


FIG. 8

FILESYSTEM 900

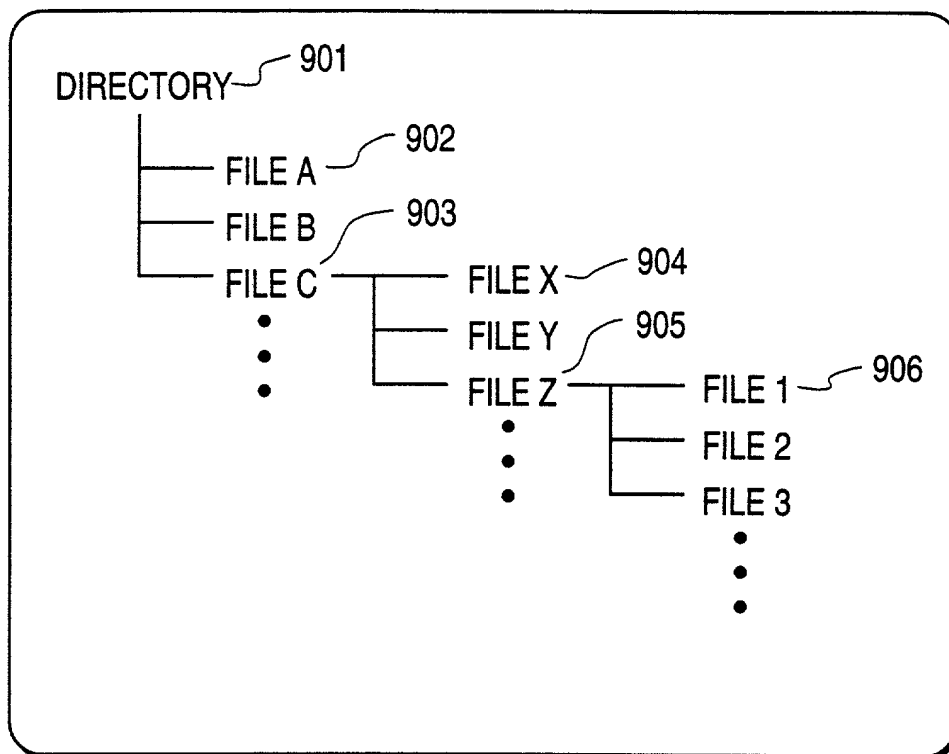


FIG. 9

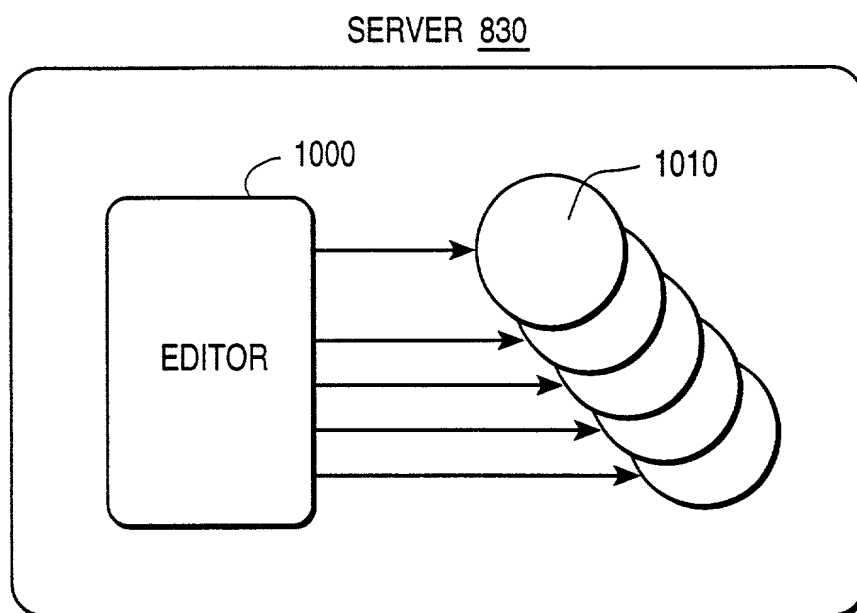


FIG. 10

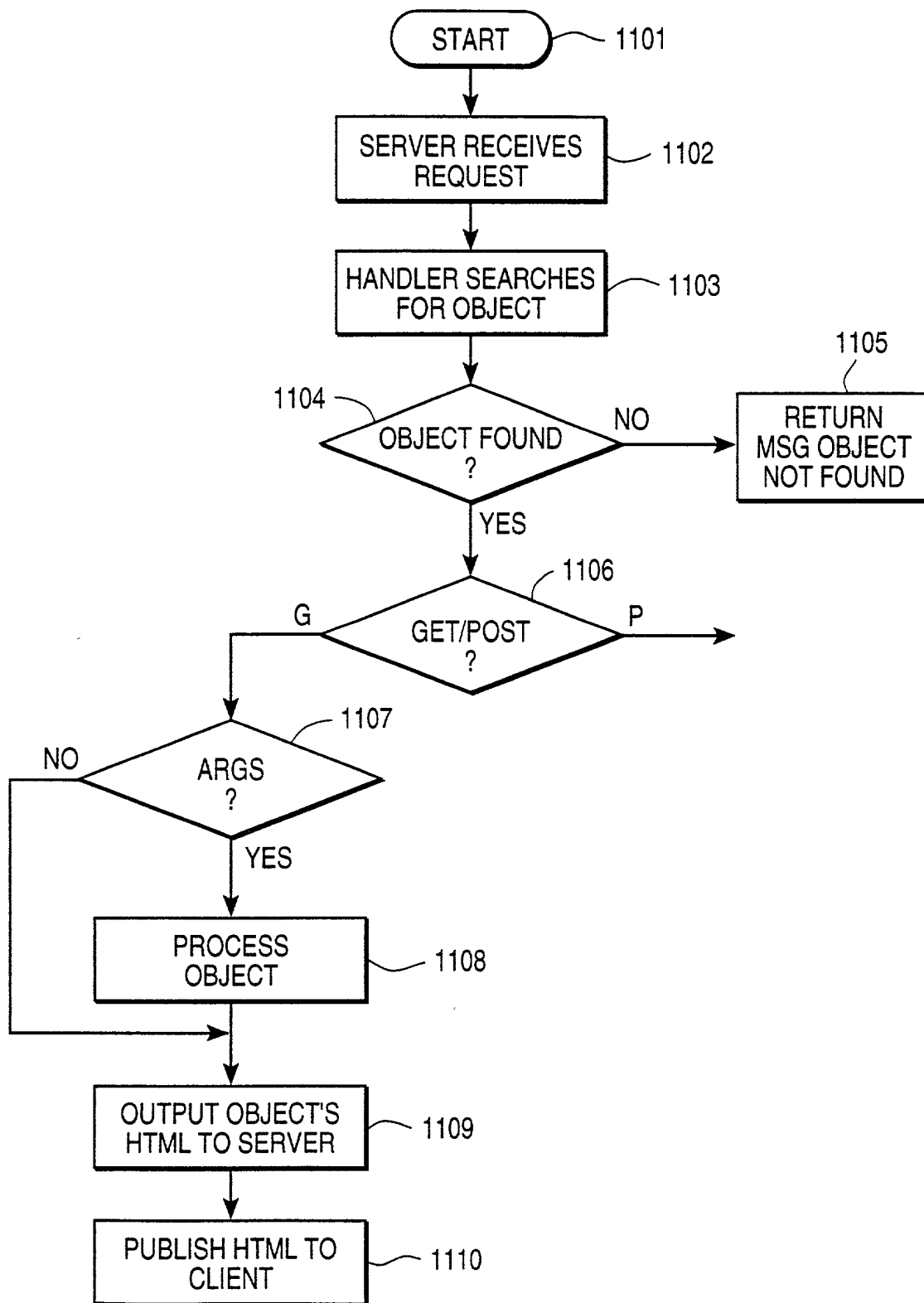


FIG. 11

Attorney's Docket No.: 04860.P1712

Patent

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below, next to my name.

I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Method and Apparatus for Transmitting Documents over a Network

the specification of which

_____ is attached hereto.
X was filed on September 27, 1996 as
United States Application Number 08/721,173
or PCT International Application Number _____
and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above. I do not know and do not believe that the claimed invention was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, and that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months (for a utility patent application) or six months (for a design patent application) prior to this application.

I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d), of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority
Claimed

<u>(Number)</u>	<u>(Country)</u>	<u>(Day/Month/Year Filed)</u>	<u>Yes</u>	<u>No</u>
<u>(Number)</u>	<u>(Country)</u>	<u>(Day/Month/Year Filed)</u>	<u>Yes</u>	<u>No</u>
<u>(Number)</u>	<u>(Country)</u>	<u>(Day/Month/Year Filed)</u>	<u>Yes</u>	<u>No</u>

I hereby claim the benefit under title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below

<u>(Application Number)</u>	<u>Filing Date</u>
<u>(Application Number)</u>	<u>Filing Date</u>

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

<u>(Application Number)</u>	<u>Filing Date</u>	<u>(Status -- patented, pending, abandoned)</u>
<u>(Application Number)</u>	<u>Filing Date</u>	<u>(Status -- patented, pending, abandoned)</u>

[illegible]

Full Name of Second/Joint Inventor John Lilly
Inventor's Signature [Signature] Date 1/10/97
Residence Austin, Texas Citizenship USA
(City, State) (Country)
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Title 37, Code of Federal Regulations, Section 1.56
Duty to Disclose Information Material to Patentability

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclosure information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) Prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made or record in the application, and

(1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.